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L10: Entry 2 of 2   File: DWPI   Apr 28, 2003

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TITLE: Image transmission system e.g. facsimile - has transmitter to transmit encoded data to called party, after compression encoding image data extracted from alternate lines of output from surface and back side reading units

PATENT-ASSIGNEE: RICOH KK (RICO)

PRIORITY-DATA: 1996JP-0115692 (April 13, 1996)

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INT-CL (IPC): H04 N 1/00; H04 N 1/32; H04 N 1/387; H04 N 1/413

ABSTRACTED-PUB-NO: JP 09284438A
BASIC-ABSTRACT:

The system includes reading units (2,3) to read image on surface and back side of document conveyed in a subscanning direction to the main scanning direction. An extracting unit (4) extracts image data of alternate lines from surface reading unit and back side reading units.

The extracted image data are subjected to compression encoding by an encoder (5). The encoded data are then transmitted to called party by a transmitter (6).

ADVANTAGE - Avoids use of large size memory. Shortens transmission time.

ABSTRACTED-PUB-NO: JP 09284438A
EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.1/10

PATENT ABSTRACTS OF JAPAN

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| (21)Application number : **08-115692** | (71)Applicant : **RICOH CO LTD** |
| (22)Date of filing :   **13.04.1996** | (72)Inventor : **OOMORI MASATAKE** |

(54) FACSIMILE EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a facsimile equipment simultaneously reading both faces of a both-sided original and alternately compressing and transmitting/receiving image data on front and rear sides line by line.

SOLUTION: This facsimile equipment reads the front and rear faces of the both-face original 7 by the unit of a line by means of a front face reading part 2 and a rear face reading part 3 to alternately output line by line to a selection part 4. The part 4 alternately outputs image data from the parts 2 and 3 to a compression-encoding part 5, which encodes image data alternately inputted from the part 4 by a prescribed encoding system to transmit to an opposite party through a transmission part. At the time of encoding by a two-dimensional coding system, the part 5 encodes image data by referring to a line before the line before a presently encoding line as a reference line at the time of encoding by an arithmetic encoding system, the part 5 select pixels at every other line as reference pixels concerning lines before the presently encoding line.
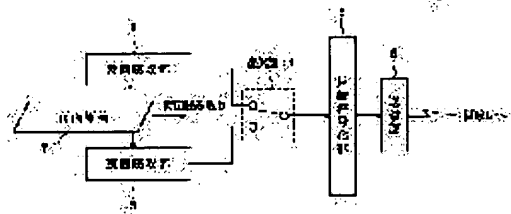
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CLAIMS

[Claim(s)]
[Claim 1] In the facsimile apparatus which performs facsimile communication by the predetermined facsimile communication procedure A surface reading means to scan the front face of the manuscript conveyed in the direction of vertical scanning to a main scanning direction, and to read the image of the front face of said manuscript, A rear-face reading means to scan the rear face of said manuscript conveyed in said direction of vertical scanning to a main scanning direction, and to read the image of the rear face of said manuscript, Said surface reading means and the data fetch means which takes out the image data for one line from said rear-face reading means by turns, Facsimile apparatus characterized by having the compression coding means which carries out compression coding of said image data taken out by said data fetch means with a predetermined compression coding method, and a transmitting means to transmit said image data by which compression coding was carried out with said compression coding means to a phase hand.
[Claim 2] In the facsimile apparatus which performs facsimile communication by the predetermined facsimile communication procedure A surface reading means to scan the front face of the manuscript conveyed in the direction of vertical scanning to a main scanning direction, and to read the image of the front face of said manuscript, A rear-face reading means to scan the rear face of said manuscript conveyed in said direction of vertical scanning to a main scanning direction, and to read the image of the rear face of said manuscript, Said surface reading means and the data fetch means which takes out the image data for one line from said rear-face reading means by turns, The compression coding means which carries out compression coding of said image data taken out by said data fetch means with a predetermined compression coding method, The storage means for storing temporarily said image data by which compression coding was carried out with said compression coding means, A coding / decryption means to divide into the image data of the front face of said manuscript, and image data on the back, and to encode again, respectively after decrypting said image data stored temporarily for said storage means, A selection means to choose said image data stored temporarily for said storage means, or said image data which said coding / decryption means encoded according to the function of a transmission place, Facsimile apparatus characterized by having a transmitting means to transmit said image data which said selection means chose to said phase hand.
[Claim 3] Said compression coding means is facsimile apparatus according to claim 1 or 2 characterized by referring to beforehand Rhine in present Rhine which carries out compression coding of said image data by predetermined two dimensional coding, and is carrying out current coding on the occasion of the compression coding concerned as reference Rhine.
[Claim 4] Said compression coding means is facsimile apparatus according to claim 1 or 2 characterized by choosing the reference pixel at the time of compression coding at intervals of a line about Rhine before present Rhine which carries out compression coding of said image data with a predetermined algebraic-sign-ized method, and is carrying out current coding on the occasion of the compression coding concerned.
[Claim 5] In the facsimile apparatus which performs facsimile communication by the predetermined

facsimile communication procedure A receiving means to receive the encoded image data which is transmitted by the phase hand, A decryption means to decrypt said encoded image data which said receiving means received, An image reconstruction means to take out at a time by turns said image data of one line decrypted by said decryption means, and to reconfigurate as the 1st image data and 2nd image data for 1 page, Facsimile apparatus characterized by having the record means which carries out the record output of the image at the recording paper based on said image data reconfigurated by said image reconstruction means.

[Claim 6] In the facsimile apparatus which performs facsimile communication by the predetermined facsimile communication procedure A receiving means to receive the encoded image data which is transmitted by the phase hand, A decryption means to decrypt said encoded image data which said receiving means received, The data fetch means which takes out at a time by turns said image data of one line decrypted by said decryption means, An image reconstruction means to reconfigurate said one image data in every other line as the 1st image data for 1 page among said image data for every Rhine which said data fetch means took out, The compression coding means which carries out compression coding of said image data in every other line of another side again among said image data for every Rhine which said data fetch means took out, A storage means to store temporarily said image data by which compression coding was carried out with said compression coding means as the 2nd image data for 1 page, The record means which carries out the record output of the image at the recording paper based on said image data, Choose by turns said 1st image data reconfigurated by the preparation and said image reconstruction means, and said 2nd image data memorized by said storage means, output said 1st image data to said record means as it is, and while carrying out a record output Facsimile apparatus characterized by outputting to said record means and carrying out a record output after decrypting said 2nd image data with said decryption means.

[Claim 7] Said decryption means is facsimile apparatus according to claim 5 or 6 characterized by referring to beforehand Rhine in present decryption Rhine which decrypts said image data encoded by two dimensional coding, and is carrying out the current decryption on the occasion of this decryption as reference Rhine.

[Claim 8] Said decryption means is facsimile apparatus according to claim 5 or 6 characterized by choosing the reference pixel at the time of a decryption at intervals of a line about Rhine before present decryption Rhine which decrypts said image data encoded by the algebraic-sign-ized method, and is carrying out the current decryption on the occasion of this decryption.

[Claim 9] In the facsimile apparatus which performs facsimile communication by the predetermined facsimile communication procedure A receiving means to receive the encoded image data which is transmitted by the phase hand, A decryption means to decrypt said encoded image data which said receiving means received, The record means which carries out the record output of the image at the recording paper based on said image data, An image reconstruction means to arrange said image data for continuous two lines decrypted by said decryption means lining up side-by-side on one line on said recording paper in the size which can carry out a record output with said record means, to reconfigurate an image, and to output to said record means, Facsimile apparatus characterized by preparation ******.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Without using mass memory for a detail about facsimile apparatus, this invention reads both sides of a manuscript to coincidence, and relates to the facsimile apparatus which transmits and records image data appropriately.
[0002]
[Description of the Prior Art] In a former and image data transmission unit, for example, facsimile apparatus As the block diagram is shown in drawing 10 , facsimile apparatus 50 Under control of the system control section 51, at the time of transmission The image data of the manuscript read with the scanner 52 by coding / decryption section 53 MH (Modified Huffman) coding method, MR (Modufied Relative element address designate) coding method, Or after carrying out compression coding by standard coding methods for binary facsimile, such as a MMR (Modified MR) coding method, it accumulates in a target in an image memory 54 temporarily. It has transmitted to partner facsimile apparatus by outputting to Circuit L through the communications control section 55, a modem 56, and the network control section 57. Moreover, it decodes to the original image data by coding [after the network control section 57, a modem 56, and the communications control section 55 receiving the encoded image data to which facsimile apparatus 50 is sent through Circuit L in the time of reception under control of the system control section 51 and accumulating in a target in an image memory 54 temporarily] / decryption section 53, and a record output is carried out by the plotter 58 at the recording paper. In addition, in drawing 10 , the display which displays information is prepared for the operator from the various actuation keys which perform various actuation, such as transmitting actuation, and facsimile apparatus 50, and each part of the above is connected to the actuation display 59 by the bus 60.

[0003] Such conventional facsimile apparatus 50 is usually equipped only with one scanner 52 for an image input, and can read only one side of a manuscript. therefore, although it could be made to be able to read with a scanner 52 as it is in the case of the double-sided manuscript with which information was indicated to both sides and could transmit to it about one side, on the other hand, it was alike, and was related, and it needed to carry out whether a scanner 52 is made to read what was once copied, or a manuscript would be turned over and a scanner 52 would be made to read, and needed to transmit, and the handling of a double-sided manuscript was troublesome.
[0004] Then, the image data transmission unit which reads the drawing information on double-sided is proposed, without taking a copy or turning a double-sided manuscript over conventionally.
[0005] The double-sided scanner indicated by JP,2-291764,A is one of such things, for example, and this is outputted as data of an image with which the front face and rear face of a manuscript were horizontally located in a line by reading both sides of a manuscript with a line sensor, respectively, and outputting the output for one line of each line sensor as one serial output.
[0006] Moreover, if the data which transmitted, having allotted two image sensors for there being facsimile indicated by JP,2-124680,A and for this reading both sides, and reading about the whole

surface, and were read to coincidence, already concerning one side are memorized in memory and transmission of the 1st page is completed, the data of one side will already have been read from memory, and it will have transmitted.

[0007] Furthermore, there is a facsimile transmitter indicated by JP,64-50665,A, and this read both sides of a manuscript to coincidence, and has transmitted each information by another telephone line.

[0008]
[Problem(s) to be Solved by the Invention] However, if it was in such conventional facsimile apparatus, in addition, there was room of amelioration.

[0009] Namely, if it is in a thing given in JP,2-291764,A Since an image with which both sides were located in a line is outputted as every one line of a front face and a rear face is outputted by turns, For example, it accumulates for once making a note. if it is going to transmit such an image -- an oblong image -- becoming -- the die length of the image of a main scanning direction -- a manuscript twice the size of original -- becoming -- a receiving side -- a certain processing -- After reproducing, the printed output needed to be carried out, and there was a problem that availability was bad.

[0010] Moreover, if it is in a thing given in JP,2-124680,A Since both sides of a manuscript were read with image sensors, the image data of one side transmitted as it is, the image data of other sides was memorized in memory and the image data of other sides was transmitted after transmission of the image data of one side, Although memory may overflow before the price of facsimile apparatus not only becomes high, but mass memory is needed and transmission of one side is completed in the case of a long manuscript Since correspondence when memory overflows was not taken into consideration, there was a problem that the image data of a manuscript could not be transmitted appropriately. Moreover, although making memory unnecessary by shifting and arranging image sensors in the direction of vertical scanning in this official report, and indicating reducing required memory space, and shifting image sensors above by 1 page in the direction of vertical scanning was indicated, this view did not take a long manuscript into consideration, but had the problem that it could not function, as a usual G3 facsimile.

[0011] Furthermore, although air time could be shortened since both sides of a manuscript were read to coincidence and each information was transmitted by another telephone line, if it was in a thing given in JP,64-50665,A, the receiving side also needed to take the surely same configuration and had the problem that transmission in the common facsimile which can usually receive only the information on one circuit could not be performed.

[0012] Then, invention according to claim 1 aims at offering the cheap facsimile apparatus which can read a double-sided manuscript to coincidence and can be transmitted, without using a mass storage means by transmitting, after taking out and compressing the image data of every one line by turns from a surface reading means and a rear-face reading means.

[0013] Invention according to claim 2 takes out the image data of every one line from a surface reading means and a rear-face reading means by turns. By choosing and transmitting whether according to the function of a transmission place, it compresses as it is and transmits, or the compressed image data is recompressed for every rear-face image data with surface image data, and it transmits The suitable image data according to a phase hand's function is transmitted, and it aims at offering the facsimile apparatus which can carry out the record output of the image of a double-sided manuscript suitable for a phase hand.

[0014] Invention according to claim 3 is faced taking out the image data of every one line from a surface reading means and a rear-face reading means by turns, and compressing by predetermined two dimensional coding. By referring to the image data of beforehand Rhine in present Rhine which is carrying out current coding as reference Rhine It encodes referring to Rhine which has correlation in present Rhine, the amount of signs is reduced appropriately, and it aims at offering the facsimile apparatus which can shorten air time.

[0015] Invention according to claim 4 is faced taking out the image data of every one line from a surface reading means and a rear-face reading means by turns, and carrying out compression coding with a predetermined algebraic-sign-ized method. About Rhine before present Rhine which is carrying out

current coding By choosing the reference pixel at the time of compression coding at intervals of a line, it encodes referring to only a pixel with correlation, the amount of signs is reduced appropriately, and it aims at offering the facsimile apparatus which can shorten air time.

[0016] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line, invention according to claim 5 Decrypt the image data concerned, take out one line at a time by turns, reconfigurate as surface image data and image data on the back, and by carrying out a record output The image data of the front face of a double-sided manuscript and image data on the back reproduce appropriately the image data by which compression coding was carried out for every line, and aim at offering the facsimile apparatus which can carry out a record output as a surface image and a rear-face image.

[0017] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line, invention according to claim 6 While decrypting the image data concerned, taking out one line at a time by turns, reconfigurating the 1st image data for 1 page by the image data in every other line and carrying out a record output If the record output of the 1st image data is completed after compressing again other image data in every other line and memorizing for a storage means as the 2nd image data for 1 page, by decrypting the 2nd image data again and carrying out a record output Reducing memory space, the image data of the front face of a double-sided manuscript and image data on the back reproduce appropriately the image data by which compression coding was carried out for every line, and aim at offering the cheap facsimile apparatus which can carry out a record output as a surface image and a rear-face image.

[0018] By facing that the image data of the front face of a double-sided manuscript and image data on the back decrypt the image data in which compression coding was carried out by predetermined two dimensional coding for every line, and referring to beforehand Rhine in present decryption Rhine decrypted now, invention according to claim 7 is decrypted referring to Rhine which has correlation in present Rhine, and aims at offering the facsimile apparatus which can reproduce image data appropriately.

[0019] Invention according to claim 8 is faced that the image data of the front face of a double-sided manuscript and image data on the back decrypt the image data by which compression coding was carried out with the predetermined algebraic-sign-ized method for every line. About Rhine before present decryption Rhine decrypted now, by choosing the reference pixel at the time of a decryption at intervals of a line, it decrypts referring to only a pixel with correlation, and aims at offering the facsimile apparatus which can reproduce image data appropriately.

[0020] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line, invention according to claim 9 Decrypt the image data concerned, arrange the image data for continuous two lines lining up side-by-side, reconfigurate an image, and by carrying out a record output It aims at offering the facsimile apparatus which can carry out the record output of a surface image and the rear-face image with an easy configuration, without arranging the image data of the front face of a double-sided manuscript, and image data on the back in one sheet of recording paper, carrying out a record output, and using a special storage means.

[0021]

[Means for Solving the Problem] In the facsimile apparatus to which the facsimile apparatus of invention according to claim 1 performs facsimile communication by the predetermined facsimile communication procedure A surface reading means to scan the front face of the manuscript conveyed in the direction of vertical scanning to a main scanning direction, and to read the image of the front face of said manuscript, A rear-face reading means to scan the rear face of said manuscript conveyed in said direction of vertical scanning to a main scanning direction, and to read the image of the rear face of said manuscript, Said surface reading means and the data fetch means which takes out the image data for one line from said rear-face reading means by turns, The above-mentioned purpose is attained by having the compression coding means which carries out compression coding of said image data taken out by said

data fetch means with a predetermined compression coding method, and a transmitting means to transmit said image data by which compression coding was carried out with said compression coding means to a phase hand.

[0022] The facsimile apparatus which can read a double-sided manuscript to coincidence, can transmit, can read a double-sided manuscript to coincidence and can be transmitted appropriately can be made cheap, without according to the above-mentioned configuration, using a mass storage means, since it transmits after taking out and compressing the image data of every one line by turns from a surface reading means and a rear-face reading means.

[0023] In the facsimile apparatus to which the facsimile apparatus of invention according to claim 2 performs facsimile communication by the predetermined facsimile communication procedure A surface reading means to scan the front face of the manuscript conveyed in the direction of vertical scanning to a main scanning direction, and to read the image of the front face of said manuscript, A rear-face reading means to scan the rear face of said manuscript conveyed in said direction of vertical scanning to a main scanning direction, and to read the image of the rear face of said manuscript, Said surface reading means and the data fetch means which takes out the image data for one line from said rear-face reading means by turns, The compression coding means which carries out compression coding of said image data taken out by said data fetch means with a predetermined compression coding method, The storage means for storing temporarily said image data by which compression coding was carried out with said compression coding means, A coding / decryption means to divide into the image data of the front face of said manuscript, and image data on the back, and to encode again, respectively after decrypting said image data stored temporarily for said storage means, A selection means to choose said image data stored temporarily for said storage means, or said image data which said coding / decryption means encoded according to the function of a transmission place, The above-mentioned purpose is attained by having a transmitting means to transmit said image data which said selection means chose to said phase hand.

[0024] According to the above-mentioned configuration, the image data of every one line is taken out from a surface reading means and a rear-face reading means by turns. Choose, and since it transmits, whether according to the function of a transmission place, it compresses as it is and transmits, or the compressed image data is recompressed for every rear-face image data with surface image data, and it transmits The suitable image data according to a phase hand's function can be transmitted, and the record output of the image of a double-sided manuscript can be carried out suitable for a phase hand.

[0025] In each above-mentioned ****, said compression coding means may carry out compression coding of said image data by predetermined two dimensional coding, and refer to beforehand Rhine in present Rhine which is carrying out current coding for it as reference Rhine on the occasion of the compression coding concerned so that you may indicate to claim 3.

[0026] It faces according to the above-mentioned configuration, taking out the image data of every one line from a surface reading means and a rear-face reading means by turns, and compressing by predetermined two dimensional coding. Since the image data of beforehand Rhine in present Rhine which is carrying out current coding is referred to as reference Rhine Also when carrying out compression coding by two dimensional coding, it can encode referring to Rhine which has correlation in present Rhine, the amount of signs can be reduced appropriately, and air time can be shortened.

[0027] Moreover, for example, said compression coding means may carry out compression coding of said image data with a predetermined algebraic-sign-ized method, and may choose the reference pixel at the time of compression coding at intervals of a line on the occasion of the compression coding concerned about Rhine before present Rhine which is carrying out current coding so that it may indicate to claim 4.

[0028] It faces according to the above-mentioned configuration, taking out the image data of every one line from a surface reading means and a rear-face reading means by turns, and carrying out compression coding with a predetermined algebraic-sign-ized method. About Rhine before present Rhine which is carrying out current coding Since the reference pixel at the time of compression coding is chosen at intervals of a line, also when carrying out compression coding with an algebraic-sign-ized method, it can encode referring to only a pixel with correlation, the amount of signs can be reduced appropriately, and

air time can be shortened.

[0029] In the facsimile apparatus to which the facsimile apparatus of invention according to claim 5 performs facsimile communication by the predetermined facsimile communication procedure A receiving means to receive the encoded image data which is transmitted by the phase hand, A decryption means to decrypt said encoded image data which said receiving means received, An image reconstruction means to take out at a time by turns said image data of one line decrypted by said decryption means, and to reconfigurate as the 1st image data and 2nd image data for 1 page, The above-mentioned purpose is attained by having the record means which carries out the record output of the image at the recording paper based on said image data reconfigurated by said image reconstruction means.

[0030] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line according to the above-mentioned configuration Decrypt the image data concerned, take out one line at a time by turns, reconfigurate as surface image data and image data on the back, and since a record output is carried out The image data of the front face of a double-sided manuscript and image data on the back can reproduce appropriately the image data by which compression coding was carried out for every line, and can carry out a record output as a surface image and a rear-face image.

[0031] In the facsimile apparatus to which the facsimile apparatus of invention according to claim 6 performs facsimile communication by the predetermined facsimile communication procedure A receiving means to receive the encoded image data which is transmitted by the phase hand, A decryption means to decrypt said encoded image data which said receiving means received, The data fetch means which takes out at a time by turns said image data of one line decrypted by said decryption means, An image reconstruction means to reconfigurate said one image data in every other line as the 1st image data for 1 page among said image data for every Rhine which said data fetch means took out, The compression coding means which carries out compression coding of said image data in every other line of another side again among said image data for every Rhine which said data fetch means took out, A storage means to store temporarily said image data by which compression coding was carried out with said compression coding means as the 2nd image data for 1 page, The record means which carries out the record output of the image at the recording paper based on said image data, Choose by turns said 1st image data reconfigurated by the preparation and said image reconstruction means, and said 2nd image data memorized by said storage means, output said 1st image data to said record means as it is, and while carrying out a record output After decrypting said 2nd image data with said decryption means, it outputted to said record means and the above-mentioned purpose is attained by carrying out a record output.

[0032] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line according to the above-mentioned configuration While decrypting the image data concerned, taking out one line at a time by turns, reconfigurating the 1st image data for 1 page by the image data in every other line and carrying out a record output Since the 2nd image data will be decrypted again and a record output will be carried out if the record output of the 1st image data is completed after compressing again other image data in every other line and memorizing for a storage means as the 2nd image data for 1 page The image data of the front face of a double-sided manuscript and image data on the back can reproduce appropriately the image data by which compression coding was carried out for every line, reducing memory space. The facsimile apparatus which can carry out a record output as a surface image and a rear-face image can be made still cheaper.

[0033] In each above-mentioned ****, said decryption means may decrypt said image data encoded by two dimensional coding, and refer to beforehand Rhine in present decryption Rhine which is carrying out the current decryption for it as reference Rhine on the occasion of this decryption so that you may indicate to claim 7.

[0034] Since beforehand Rhine in present decryption Rhine which the image data of the front face of a double-sided manuscript and image data on the back face decrypting the image data in which

compression coding was carried out by predetermined two dimensional coding for every line, and are decrypting now is referred to according to the above-mentioned configuration, also when decrypting the image data in which compression coding was carried out by two dimensional coding, it can decode referring to Rhine which has correlation in present Rhine, and image data can be reproduced appropriately.

[0035] Moreover, for example, said decryption means may decrypt said image data encoded by the algebraic-sign-ized method, and may choose the reference pixel at the time of a decryption at intervals of a line on the occasion of this decryption about Rhine before present decryption Rhine which is carrying out the current decryption so that it may indicate to claim 8.

[0036] It faces that the image data of the front face of a double-sided manuscript and image data on the back decrypt the image data by which compression coding was carried out with the predetermined algebraic-sign-ized method for every line according to the above-mentioned configuration. About Rhine before present decryption Rhine which is carrying out the current decryption Since the reference pixel at the time of a decryption is chosen at intervals of a line, also when decrypting the image data by which compression coding was carried out with the algebraic-sign-ized method, it can decode referring to only a pixel with correlation, and image data can be reproduced appropriately.

[0037] In the facsimile apparatus to which the facsimile apparatus of invention according to claim 9 performs facsimile communication by the predetermined facsimile communication procedure A receiving means to receive the encoded image data which is transmitted by the phase hand, A decryption means to decrypt said encoded image data which said receiving means received, The record means which carries out the record output of the image at the recording paper based on said image data, An image reconstruction means to arrange said image data for continuous two lines decrypted by said decryption means lining up side-by-side on one line on said recording paper in the size which can carry out a record output with said record means, to reconfigurate an image, and to output to said record means, Preparation ****** has attained the above-mentioned purpose.

[0038] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line according to the above-mentioned configuration Arrange the image data for two lines which decrypt the image data concerned and continue lining up side-by-side, reconfigurate an image, and since a record output is carried out The record output of a surface image and the rear-face image can be carried out with an easy configuration, without being able to arrange the image data of the front face of a double-sided manuscript, and image data on the back in one sheet of recording paper, being able to carry out a record output, and using a special storage means. Therefore, facsimile apparatus can be made still cheaper.

[0039]

[Embodiment of the Invention] Hereafter, the gestalt of suitable operation of this invention is explained to a detail based on an accompanying drawing. In addition, since the gestalt of the operation described below is a gestalt of suitable operation of this invention, desirable various limitation is attached technically, but especially the range of this invention is not restricted to these modes, as long as there is no publication of the purport which limits this invention in the following explanation.

[0040] Drawing 1 - drawing 5 are drawings showing the gestalt of operation of the 1st of the facsimile apparatus of this invention, the image data of the front face of a double-sided manuscript and a rear face is taken out per Rhine one by one, it encodes and transmits by the predetermined coding method, and the gestalt of this operation corresponds to claim 1, claim 3, and claim 4.

[0041] Drawing 1 is the important section circuit block diagram of the facsimile apparatus 1 which applied the gestalt of operation of the 1st of the facsimile apparatus of this invention.

[0042] In drawing 1 , although facsimile apparatus 1 is equipped with the surface read station 2, the rear-face read station 3, the selection section 4, the compression coding section 5, and transmitting section 6 grade and does not illustrate them to drawing 1 , it is equipped with each part required for facsimile apparatus 1.

[0043] The surface read station (surface reading means) 2 and the rear-face read station (rear-face reading means) 3 are arranged along the manuscript conveyance way, and read the image of both sides

of the double-sided manuscript 7 conveyed in the direction of vertical scanning in a manuscript conveyance way. That is, the adhesion mold image scanner using CCD (Charge Coupled Device) etc. is used, and the surface read station 2 and the rear-face read station 3 scan to coincidence surface 7a and rear-face 7b (refer to drawing 2) of the double-sided manuscript 7 conveyed in the direction of vertical scanning in a manuscript conveyance way per Rhine, respectively, and read the image of surface 7a of the double-sided manuscript 7, and the image of rear-face 7b in predetermined resolution. The surface read station 2 and the rear-face read station 3 will output the image data for read one line to the selection section (fetch means) 4 by turns, if the image of one line of the double-sided manuscript 7 is read. The output of the image data from this surface read station 2 and the rear-face read station 3 outputs image data to the selection section 4 similarly until it outputs the image data for one line which outputted first the image data for one line which the surface read station 2 read to the selection section 4, for example, next the rear-face read station 3 read to the selection section 4 and reading of the double-sided manuscript 7 for 1 page is completed one by one henceforth.

[0044] The selection section 4 switches the compression coding section 5 to the surface read station 2 and the rear-face read station 3 for every line, connects, switches the image data for one line of rear-face 7b of the double-sided manuscript 7 inputted from the image data and the rear-face read station 3 for one line of surface 7a of the double-sided manuscript 7 inputted from the surface read station 2 one by one, and outputs it to the compression coding section 5. Therefore, as shown in drawing 3 , the synthetic image data 8 outputted to the compression coding section 5 turns into image data with which surface image Rhine data 8a and rear-face image Rhine data 8b were located in a line one by one by turns from the selection section 4 per Rhine.

[0045] The compression coding section (compression coding means) 5 carries out compression coding of the image data inputted from the selection section 4 by various coding methods, and outputs it to the transmitting section (transmitting means) 6, and Circuits L and PSTN (dial-up line) are connected to the transmitting section 6. The transmitting section 6 performs a facsimile control procedure between partner facsimile apparatus through Circuit L, and performs facsimile communication while it performs from automatic and call-in processing.

[0046] Although the above-mentioned compression coding section 5 carries out compression coding of the image data inputted through the selection section 4 with various compression coding methods, it encodes as this compression coding method by MH (Modified Huffman) coding method which is 1-dimensional coding which carries out compression coding of the image data per Rhine, MR (Modufied Relative elementaddress designate) coding method which is two-dimensional coding, a MMR (Modified MR) coding method or an algebraic-sign-ized method, etc., for example.

[0047] When carrying out compression coding by 1-dimensional MH coding, the compression coding section 5 carries out sequential compression coding of the image data of surface 7a and the image data of rear-face 7b which are inputted through the selection section 4 per Rhine, is outputted to the transmitting section 6 and carries out facsimile transmission from the transmitting section 6 at partner facsimile apparatus.

[0048] Moreover, although it usually encodes with reference to front Rhine in coding Rhine encoded now as reference Rhine as shown in the left-hand side of drawing 4 as relation between usual coding Rhine and reference Rhine in carrying out compression coding with two-dimensional MR coding and a two-dimensional MMR coding method The synthetic image data 8 inputted into the compression coding section 5 As mentioned above, since surface image Rhine data 8a and rear-face image Rhine data 8b are located in a line by turns When it encodes with reference to front Rhine, like such usual coding front Rhine Since it is the image data of other fields of the double-sided manuscript 7, in case surface image Rhine data 8a of the synthetic image data 8 shown in drawing 3 is encoded, rear-face image Rhine data 8b without correlation will be referred to, and compressibility falls. Then, the compression coding section 5 is encoded as reference Rhine with reference to beforehand Rhine 10c which vacated one line, without referring to front Rhine 10b of coding Rhine 10a encoded now so that it may be shown as relation between coding Rhine in the gestalt of this operation on the right-hand side of drawing 4 , and reference Rhine. That is, when it is going to encode coding Rhine 10a, with reference to Rhine 10b right

above, beforehand Rhine 10c in front of one more line is made into reference Rhine. Since coding Rhine 10a in this case and beforehand Rhine 10c which is reference Rhine are the image data of the same field of the double-sided manuscript 7 and is continuous two lines, its correlation is high and its compressibility improves. therefore, the double-sided manuscript 7 -- every [one side] -- it becomes the same compressibility as the case where a two dimensional modulation is carried out, respectively. In addition, the Rhine memory for two lines is needed for the compression coding section 5 in this case.

[0049] Furthermore, in addition to present coding Rhine 11b encoded now, the reference pixel is chosen from front Rhine 11c and beforehand Rhine 11d, although each square and surrounded perimeter pixel 11 is referred to when encoding pixel 11a shown by x mark as it shows in the left-hand side of drawing 5 as an example of the usual template in algebraic-sign-izing, in carrying out compression coding with an algebraic-sign-ized method. However, the synthetic image data 8 inputted into the compression coding section 5 like the case of the above-mentioned two-dimensional coding As mentioned above, since surface image Rhine data 8a and rear-face image Rhine data 8b are located in a line by turns If it encodes with reference to the pixel of front Rhine and beforehand Rhine like the case of the above-mentioned usual template, front Rhine is the image data of other fields of the double-sided manuscript 7, and since beforehand Rhine is front Rhine of the same field, a pixel without correlation will be referred to and compressibility will fall. Then, the compression coding section 5 makes a reference pixel each square and surrounded perimeter pixel 12, when encoding image 12a of x mark so that it may be shown as an example of the template in the gestalt of this operation on the right-hand side of drawing 5 . That is, about former Rhine, the pixel referred to at intervals of a line is chosen, front Rhine 12c and Rhine 12e in front of three are vacated, and the pixel surrounded at the rectangular head (Rhine 12d in front of two and Rhine 12f in front of four) is chosen from present coding Rhine 12b as a reference pixel. Therefore, a pixel (front Rhine 12d of the same field as the same Rhine 12b as pixel 12a for coding and beforehand Rhine 12f) can be referred to as a template, and compression coding of each field of the double-sided manuscript 7 can be carried out with the same high-pressure shrinking percentage as the case where it encodes by the usual template.

[0050] Next, an operation of the gestalt of this operation is explained hereafter. Facsimile apparatus 1 reads the image of surface 7a of the double-sided manuscript 7 which has a manuscript conveyance way conveyed, and rear-face 7b per Rhine by the surface read station 2 and the rear-face read station 3, when transmitting the double-sided manuscript 7. Outputting the image data which the surface read station 2 and the rear-face read station 3 read to the selection section 4 for every Rhine from the predetermined sequence 2, for example, a surface read station, the selection section 4 outputs surface image Rhine data 8a from this surface read station 2 to the compression coding section 5. If the surface read station 2 outputs the image data for one line to the selection section 4 next, the rear-face read station 3 will output the image data for one line to the selection section 4, and the selection section 4 will output rear-face image Rhine data 8b from this rear-face read station 3 to the compression coding section 5. Therefore, as shown in the compression coding section 5 from the selection section 4 at drawing 3 , the synthetic image data 8 with which surface image Rhine data 8a and rear-face image Rhine data 8b were located in a line by turns one by one is inputted.

[0051] Although compression coding of this synthetic image data 8 is carried out and being outputted to the transmitting section 6, the compression coding section 5 carries out compression coding in each Rhine unit as it is, when carrying out compression coding by one dimensional coding at this time.

[0052] Moreover, the compression coding section 5 is encoded as reference Rhine with reference to beforehand Rhine 10c which vacated one line, without referring to front Rhine 10b of coding Rhine 10a encoded now, as shown in drawing 4 in carrying out compression coding by two dimensional coding. Therefore, coding Rhine 10a and high Rhine 10c of functionality which are the image data of a coding Rhine 10a same side, and continue can be encoded as reference Rhine, and it can encode with high-pressure shrinking percentage.

[0053] Furthermore, when carrying out compression coding with an algebraic-sign-ized method, the compression coding section 5 encodes each perimeter pixel 12 square and surrounded [image 12a shown by x mark] as a reference pixel, as shown in drawing 5 . That is, about former Rhine, the pixel

referred to at intervals of a line is chosen, Rhine 12d in front of front Rhine 12b and three is vacated, and a reference pixel is chosen from present coding Rhine 12a for the pixel surrounded at the rectangular head of Rhine 12c in front of two, and Rhine 12e in front of four. Therefore, the pixel of the same Rhine as pixel 12a for coding, front Rhine of the same field, and beforehand Rhine can be referred to as a template, and compression coding can be carried out with the same high-pressure shrinking percentage.

[0054] Thus, the image data by which compression coding was carried out in the compression coding section 5 is outputted to the transmitting section 6, and is transmitted to partner facsimile apparatus through Circuit L from the transmitting section 6.

[0055] Therefore, since according to the gestalt of this operation it transmits after taking out and compressing the image data of every one line by turns from the surface read station 2 and the rear-face read station 3 Without using the mass storage means for memorizing the image data of one side Moreover, while being able to make cheap the facsimile apparatus 1 which can read the double-sided manuscript 7 to coincidence, can transmit, can read the double-sided manuscript 7 to coincidence, and can be transmitted, without making the double-sided manuscript 7 read one side every The availability of facsimile apparatus 1 can be raised.

[0056] Moreover, since beforehand Rhine 10c of present Rhine (coding Rhine) 10a which it faces compressing by two dimensional coding, and has been encoded in the compression coding section 5 now is referred to as reference Rhine, it can encode referring to Rhine 10c which has correlation in present Rhine 10a, and the amount of signs can be reduced appropriately. Consequently, air time can be shortened.

[0057] Furthermore, since the reference pixel at the time of compression coding is chosen at intervals of a line about Rhine before present Rhine 12b which it faces carrying out compression coding with an algebraic-sign-ized method, and has been encoded in the compression coding section 5 now, it can encode referring to only a pixel with correlation, and the amount of signs can be reduced appropriately. Consequently, air time can be shortened.

[0058] In addition, like [when encoding by two dimensional coding and the algebraic-sign-ized method by the compression coding section 5 / in the case of the conventional "double-sided scanner" indicated by above-mentioned JP,2-291764,A], the data which read both sides are arranged so that both sides may be located in a line with a longitudinal direction, and as compared with the case where it encodes as one image data, there are few amounts of the needed Rhine memory and they end. namely, when a main scanning direction becomes twice as many size as this Also when it is the two dimensional modulation which needs the Rhine memory for at least two lines, and also when it is the template of algebraic-sign-izing which needs the Rhine memory for three lines, in the case of the conventional "double-sided operating set", the twice as many Rhine memory size as this is simply needed, but By the above-mentioned coding approach in the compression coding section 5 of the gestalt of this operation, the Rhine memory is good at one 3= 1.67 times the amount [5 /] of memory of this, and, in the case of a two dimensional modulation, in the case of-izing [3 / 2= 1.5 times, and / algebraic-sign], the amount of signs becomes above almost the same.

[0059] Drawing 6 is drawing showing the gestalt of operation of the 2nd of the facsimile apparatus of this invention, and according to a transmitting phase hand's function, the gestalt of this operation changes the compression approach and corresponds to claim 2, claim 3, and claim 4. In addition, the gestalt of this operation is applied to the same facsimile apparatus as the gestalt of implementation of the above 1st, in explanation of the gestalt of this operation, gives the same sign to the same component as the gestalt of implementation of the above 1st, and omits the detailed explanation.

[0060] In drawing 6 , while facsimile apparatus 20 is equipped with the same surface read station 2 as a gestalt, the rear-face read station 3, the selection section 4, the compression coding section 5, and the transmitting section 6 of the above-mentioned implementation, it has the memory section 21, the selection section 22, and compression coding section 23 grade, and the compression coding section 23 is equipped with the decryption section 24 and coding section 25 grade.

[0061] The surface read station 2 and the rear-face read station 3 read surface 7a and rear-face 7b of the double-sided manuscript 7 which have a manuscript conveyance way conveyed, respectively, output

them to the selection section 4, and output the selection section 4 to the sequential compression coding section 5 by making into the synthetic image data 8 (referring to <u>drawing 3</u>) surface image Rhine data 8a and rear-face image Rhine data 8b which are sent for every Rhine one by one from the surface read station 2 and the rear-face read station 3.

[0062] The compression coding section 5 encodes with the above-mentioned one dimensional coding, two dimensional coding, or an algebraic-sign-ized method, and outputs the synthetic image data 8 inputted from the selection section 4 to the memory section 21.

[0063] The memory section 21 stores temporarily the image data encoded in the compression coding section 5, and outputs it to the selection section 22, and the selection section 22 connects the memory section 21 to the compression coding section 23 and the transmitting section 6 alternatively, and outputs the compressed image data which is inputted from the memory section 21 to the compression coding section 23 or the transmitting section 6.

[0064] The actuation is controlled by the control section of the facsimile apparatus 1 which is not illustrated, and the selection section 22 controls actuation of the selection section 22 by whether it has the regenerative function which a control section takes out the image data of the double-sided manuscript 7 with which the facsimile apparatus of the transmitting phase hand of image data was compressed for every Rhine for every Rhine, reconfigurates, and carries out a record output. Namely, although facsimile apparatus 20 exchanges a facsimile control signal between phase hand facsimile apparatus and performs a facsimile control procedure at the time of facsimile transmission At this time, a control section with the facsimile control signal transmitted by the phase hand When it judges whether phase hand facsimile apparatus has the above-mentioned regenerative function and a phase hand's facsimile apparatus has the regenerative function When change-over actuation of the selection section 22 is carried out so that the memory section 21 may be connected to the transmitting section 6, and phase hand facsimile apparatus does not have the regenerative function, change-over actuation of the selection section 22 is carried out so that the memory section 21 may be connected to the compression coding section 23.

[0065] As mentioned above, the compression coding section 23 is equipped with the decryption section 24 and the coding section 25, and the decryption section 24 decrypts the encoded image data which is inputted from the memory section 21 through the selection section 22 for every line one by one, and it outputs the decrypted image data to the coding section 25 at intervals of a line. Namely, by the decryption section's 24 decrypting the synthetic image data 8 by which compression coding was carried out at intervals of a line, outputting it to the coding section 25, and repeating successively the processing which cancels other image data of one line For example, if only surface image Rhine data 8a is decrypted, and it outputs to the coding section 25, and surface image Rhine data 8a for 1 page is decoded and it outputs to the coding section 25 Next, only rear-face image Rhine data 8b is again decrypted among the synthetic image data 8 which is inputted from the memory section 21 through the selection section 22 and by which compression coding was carried out, and it outputs to the coding section 25.

[0066] The coding section 25 carries out compression coding of surface image Rhine data 8a and rear-face image Rhine data 8b which are inputted from the decryption section 24 and which were decrypted like the above-mentioned compression coding section 5, and outputs them to the transmitting section 6. In addition, the coding section 25 is encoded with usual two dimensional coding and a usual algebraic-sign-ized method, when encoding image data with two dimensional coding and an algebraic-sign-ized method.

[0067] Therefore, according to the gestalt of this operation, the image data of every one line is taken out from the surface read station 2 and the rear-face read station 3 by turns, and it compresses in the compression coding section 5 as synthetic image data 8 with which surface image Rhine data 8a and rear-face image Rhine data 8b were compared by turns, and once memorizes in the memory section 21. And by whether the facsimile apparatus of a transmission place has the regenerative function, in the compression coding section 5, it can choose whether the image data which carried out compression coding is transmitted as it is, or the synthetic compressed image data 8 is recompressed into every

surface image Rhine data 8a and rear-face image Rhine data 8b in the compression coding section 23, and it transmits, and can transmit. Consequently, the encoded suitable image data according to the function of phase hand facsimile apparatus can be transmitted, and a phase hand can transmit the image data which can carry out the record output of the image of the double-sided manuscript 7 appropriately. Therefore, the availability of facsimile apparatus can be raised further.

[0068] Drawing 7 is drawing showing the gestalt of operation of the 3rd of the facsimile apparatus of this invention, the image data concerned is decrypted and it takes out one line at a time by turns, and it reconfigurates as surface image data and image data on the back, a record output is carried out, and the gestalt of this operation corresponds to claim 5, claim 7, and claim 8, if the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line.

[0069] In drawing 7 , although facsimile apparatus 30 is equipped with a receive section 31, the decryption section 32, the selection section 33, and output section 34 grade and does not illustrate them, it is equipped with each part required as facsimile apparatus 30 other than these.

[0070] Circuits L and PSTN (dial-up line) are connected, and a receive section 31 performs a facsimile control procedure in a receive section 31 between partner facsimile apparatus through Circuit L, and gives it facsimile communication while it performs from automatic and call-in processing.

[0071] The decryption section 32 decrypts the image data which the receive section 31 received and by which compression coding was carried out by the predetermined decryption approach, and outputs it to the selection section 33. For example, the decryption section 32 is decrypted according to the coding method concerned, when it decrypts according to the coding method concerned when compression coding of the image data is carried out by one dimensional coding, and compression coding of the image data is carried out by two dimensional coding. Moreover, when compression coding of the image data is carried out by the algebraic-sign-ized method, it decrypts according to the algebraic-sign-ized method concerned.

[0072] And in case it decrypts by two dimensional coding, the decryption section 32 is decrypted by referring to beforehand Rhine in decryption Rhine as reference Rhine, as shown in drawing 4 . Namely, although usually decrypted with reference to front Rhine in decryption Rhine decrypted now as reference Rhine like the case of coding shown in drawing 4 As mentioned above, since surface image Rhine data 8a and rear-face image Rhine data 8b are located in a line by turns, the image data 8 inputted into the decryption section 32 Like such a usual decryption, if it decrypts with reference to front Rhine, since it is the image data of other fields of the double-sided manuscript 7, in case it decrypts, front Rhine will refer to the Rhine data without correlation, and cannot decrypt them appropriately. Then, the decryption section 32 is decrypted with reference to beforehand Rhine vacated one line as reference Rhine, without referring to front Rhine in decryption Rhine decrypted now the same with having been shown in the right-hand side of drawing 4 . Since decryption Rhine and reference Rhine in this case are the image data of the same field of the double-sided manuscript 7 and are continuous two lines, they can be decrypted appropriately.

[0073] Moreover, in case the decryption section 32 is decrypted with an algebraic-sign-ized method, as shown in drawing 5 , it chooses from present decryption Rhine the pixel referred to at intervals of a line about former Rhine.

[0074] That is, in addition to present decryption Rhine decrypted now, the reference pixel is chosen from front Rhine and beforehand Rhine, although it is square and each surrounded perimeter pixel is referred to to the pixel for [of x mark] a decryption, as shown in the left-hand side of drawing 5 . However, the image data inputted into the decryption section 32 As mentioned above, since surface image Rhine data 8a and rear-face image Rhine data 8b are located in a line by turns When it decrypts with reference to the pixel of front Rhine and beforehand Rhine like the case of the above-mentioned usual template, front Rhine It is the image data of other fields of the double-sided manuscript 7, and since beforehand Rhine is front Rhine of the same field, it will refer to a pixel without correlation and cannot decrypt it appropriately. Then, as shown in the right-hand side of drawing 5 , to the pixel for [of x mark] a decryption, about former Rhine, the decode section 32 chooses the pixel referred to at

intervals of a line, vacates front Rhine and Rhine in front of three, and chooses from present decryption Rhine the pixel surrounded at the rectangular head in Rhine in front of two, and Rhine in front of four as a reference pixel. Therefore, the pixel of the same Rhine as the pixel for a decryption, front Rhine of the same field, and beforehand Rhine can be referred to as a template, and it can decrypt appropriately like the case where each side of the double-sided manuscript 7 is decrypted by the usual template.

[0075] The selection section 33 is equipped with the change-over section 35 and two memory 36 and 37, and for every Rhine of the image data which the decryption section 32 decrypted, the change-over section 35 switches the decryption section 35 to memory 36 and memory 37 one by one, and connects it. If the sequential storage of the image data inputted from the change-over section 35 is carried out and the image data for 1 page is inputted, memory 36 and 37 will be reconfigured as the surface image data of one page, and rear-face image data, respectively, and will be outputted to the output section 34.

[0076] A thermal recording device, an electrophotography type recording device, etc. with which the output section 34 used for example, the thermal component are used, and the output section 34 carries out the record output of the image at the recording paper based on the image data for 1 page inputted from memory 36 and memory 37.

[0077] Next, an operation of the gestalt of this operation is explained hereafter. Facsimile apparatus 30 receives the image data which is transmitted by the receive section 31 from partner facsimile apparatus and by which compression coding was carried out, and outputs it to the decryption section 32. Surface 7a and rear-face 7b of the double-sided manuscript 7 are compressed by turns for every line, and this image data by which compression coding was carried out is encoded by one dimensional coding, two dimensional coding, or the algebraic-sign-ized method. The decryption section 32 decrypts this image data by which compression coding was carried out with the same coding method as the coding method with which this image data was encoded, and outputs it to the selection section 33. That is, when it decrypts according to the coding method concerned when compression coding of the image data is carried out by one dimensional coding, and compression coding of the image data is carried out by two dimensional coding, it decrypts according to the coding method concerned. Moreover, when compression coding of the image data is carried out by the algebraic-sign-ized method, it decrypts according to the algebraic-sign-ized method concerned.

[0078] And in case it is decrypted by referring to beforehand Rhine in decryption Rhine as reference Rhine as mentioned above in case the decryption section 32 is decrypted by two dimensional coding, and it is decrypted with an algebraic-sign-ized method, it chooses and decrypts the pixel of the template referred to at intervals of a line about former Rhine from present decryption Rhine. Therefore, the image data encoded by two dimensional coding or the algebraic-sign-ized method can be decrypted appropriately.

[0079] The selection section 33 distributes the decrypted image data which is inputted per Rhine one by one to memory 36 and memory 37 for every Rhine by the change-over section 35, makes it memorize from the decryption section 32, and is reconfigured in memory 36 and memory 37 as the surface image data and rear-face image data for 1 page.

[0080] If it outputs to the output section 34 from surface image data among the image data of this memory 36 and memory 37 and the record output of the image of surface image data is carried out in the output section 34 at the detail paper next, rear-face image data will be outputted to the output section 34 from memory 36 or memory 37, and the record output of the image of rear-face image data will be carried out in the output section 34 at the detail paper.

[0081] After receiving and decrypting all image data like the above, it reconfigurates as surface image data and rear-face image data, and a record output is carried out at the recording paper.

[0082] Therefore, according to the gestalt of this operation, the image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b receive the image data by which compression coding was carried out for every line. Decrypt the image data concerned in the decryption section 32, take out one line at a time by turns, reconfigure in memory 36 and 37 as the image data of surface 7a, and image data of rear-face 7b, and since a record output is carried out The image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b can reproduce appropriately the image

data by which compression coding was carried out for every line, and can carry out a record output as a surface image and a rear-face image.

[0083] Moreover, the image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b can decode referring to Rhine which has correlation in present Rhine, since it will decrypt with reference to beforehand Rhine in present decryption Rhine decrypted now, if compression coding is carried out by predetermined two dimensional coding for every line, and image data can reproduce appropriately the image data by which compression coding was carried out by two dimensional coding.

[0084] Furthermore, if compression coding of the image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b is carried out by the predetermined algebraic-sign-ized method for every line, image data Since the reference pixel at the time of a decryption is chosen at intervals of a line about Rhine before present decryption Rhine decrypted now, it can decode referring to only a pixel with correlation, and the image data by which compression coding was carried out with the algebraic-sign-ized method can be reproduced appropriately.

[0085] Drawing 8 is drawing showing the gestalt of operation of the 4th of the facsimile apparatus of this invention. The gestalt of this operation If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line Decrypt the image data concerned, take out one line at a time by turns, and one image data in every other line is reconfigurated as image data for 1 page by the decrypted image data. A record output is carried out, it decrypts again, a record output is carried out, and the image data of another side in every other line corresponds to claim 6, claim 7, and claim 8, after compressing and memorizing and completing the record output of one image data. In addition, the gestalt of this operation is applied to the same facsimile apparatus as the gestalt of implementation of the above 3rd, in explanation of the gestalt of this operation, gives the same sign to the same component as the gestalt of implementation of the above 3rd, and omits the detailed explanation.

[0086] In drawing 8 , facsimile apparatus 40 is equipped with the selection section 41, the compression coding section 42, and memory section 43 grade while it is equipped with the same receive section 31 as the gestalt of implementation of the above 3rd, the decryption section 32, and output section 34 grade.

[0087] The image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b receive the image data by which compression coding was carried out for every line, and a receive section 31 outputs to the decryption section 32, and the decryption section 32 decrypts the encoded image data which is inputted from a receive section 31 for every Rhine like the gestalt of implementation of the above 3rd according to the coding method of the image data concerned, and it outputs it to the selection section 41.

[0088] The selection section 41 is equipped with the change-over section 44 and two memory 45 and 46, and for every Rhine of the image data which the decryption section 32 decrypted, the change-over section 44 switches the decryption section 35 to memory 45 and memory 46 one by one, and connects it. If the sequential storage of the image data inputted from the change-over section 44 is carried out and the image data for 1 page is inputted, memory 45 will be reconfigurated as 1-page image data, for example, surface image data, and will be outputted to the output section 34. Memory 46 should just have the capacity which memorizes the image data which small capacity is sufficient as and was encoded in the decryption section 32 at least rather than memory 45 by one line. Memory 46 will output the image data concerned for one line to the compression coding section 42, if the image data by which it was decrypted for one line from the decryption section 32 is inputted. In addition, although he is trying to output the image data concerned for one line to the compression coding section 42 if memory 46 is formed and image data is accumulated by one line, you may make it output the decrypted image data which is inputted through the change-over section 44 from the decryption section 32 to the direct compression coding section 42 in the gestalt of this operation, without forming memory 46. If it does in this way, the still more nearly required amount of memory is reducible.

[0089] The compression coding section 42 carries out compression coding of the decrypted image data which is inputted from memory 46 by the predetermined coding approach, and outputs it to the memory section 43.

[0090] The memory section 43 has the capacity which memorizes the image data compressed in the compression coding section 42 by 1 page, and the sequential storage of the compressed image data which is inputted from the compression coding section 42 is carried out. If the image data memorized by 1 page is outputted to the memory 45 of the selection section 41 at the output section 34 and the record output of the image by the image data concerned is completed, the image data by which compression coding of [for memorized 1 page] was carried out will be outputted to the decryption section 32.

[0091] The decryption section 32 decrypts the image data for 1 page which is inputted from the memory section 43 and by which compression coding was carried out, and outputs it to the output means 34.

[0092] The output section 34 carries out the record output of the image at the recording paper based on the image data inputted from the image data and the decryption section 32 which are inputted from the memory 45 of the above-mentioned selection section 41.

[0093] Therefore, according to the gestalt of this operation, facsimile apparatus 40 receives the image data which is transmitted by the receive section 31 from partner facsimile apparatus and by which compression coding was carried out, and outputs it to the decryption section 32. This image data by which compression coding was carried out is compressed by turns for every line in surface 7a and rear-face 7b of the double-sided manuscript 7, and is encoded by one dimensional coding, two dimensional coding, or the algebraic-sign-ized method. Like the gestalt of implementation of the above 3rd, the decryption section 32 decrypts this image data by which compression coding was carried out with the same decryption method as the coding method with which this image data was encoded, and outputs it to the selection section 41.

[0094] From the decryption section 32, the selection section 41 distributes the decrypted image data which is inputted per Rhine one by one to memory 45 and memory 46 for every Rhine by the change-over section 44, outputs it, and reconfigurates it in memory 45 as the image data, for example, the surface image data, for 1 page.

[0095] The image data outputted to memory 46 is outputted to the compression coding section 42 for every line, carries out compression coding again in the compression coding section 42, and is memorized in the memory section 43.

[0096] And the image data decrypted by memory 45 is reconfigured by 1 page, if the image data for 1 page by which compression coding was carried out again is memorized by memory 43, first, image data will be read from memory 45, it will output to the output section 34, and the record output of the image for 1 page, for example, the image of surface 7a, will be carried out by the output section 34. If record of the image by the image data from this memory 45 is completed, the image data by which compression coding was carried out is read from the memory section 43, and it outputs to the decryption section 32, and it will decrypt in the decryption section 32 and will output to the output section 34. The output section 34 carries out the record output of the image for 1 page, for example, the image of rear-face 7b, at the detail paper based on the image data decrypted in the decryption section 32.

[0097] By repeating the above-mentioned processing successively and performing it, the image data which received is reproduced and a record output is carried out.

[0098] Therefore, according to the gestalt of this operation, take out at a time by turns the image data of one line decrypted in the decryption section 32, and for example, surface image data is reconfigured for a part for one one-page image data in every other line in memory 45. While carrying out a record output, for example, rear-face image data is repressed in the compression coding section 42 through the memory section 46 for a part for the one-page image data of another side in every other line. If it memorizes in the memory section 43 and record of one image data is completed, since the image data of another side will be read from the memory section 43, it will decrypt in the decryption section 32 and a record output will be carried out in the output section 34 The image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b can reproduce appropriately the image data by which compression coding was carried out for every line, and can carry out a record output as a surface image and a rear-face image. Consequently, since the image data compressed into the memory section 43 is made to memorize while being able to use the memory of a capacity small as memory 46, the memory of a capacity small as the memory section 43 can be used, and facsimile apparatus 40 can be

made cheap. In this case, if memory 46 is excluded and it is made to output image data to the compression coding section 42 from the direct change-over section 44, facsimile apparatus 40 can be made still cheaper.

[0099] Moreover, the image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b can decode referring to Rhine which has correlation in present Rhine, since it will decrypt with reference to beforehand Rhine in present decryption Rhine decrypted now, if compression coding is carried out by predetermined two dimensional coding for every line, and image data can reproduce appropriately the image data by which compression coding was carried out by two dimensional coding.

[0100] Furthermore, if compression coding of the image data of surface 7a of the double-sided manuscript 7 and the image data of rear-face 7b is carried out by the predetermined algebraic-sign-ized method for every line, image data About Rhine before present decryption Rhine which is carrying out the current decryption It can decode referring to only a pixel with correlation, since the reference pixel at the time of a decryption is chosen at intervals of a line. Although invention made by this invention person was concretely explained based on the gestalt of suitable operation since the image data by which compression coding was carried out with the algebraic-sign-ized method was appropriately reproducible It cannot be overemphasized that it can change variously in the range which this invention is not limited to the above-mentioned thing, and does not deviate from the summary.

[0101] For example, in the gestalt of the above 3rd and the 4th implementation, although the record output of the image of surface 7a of the double-sided manuscript 7 and rear-face 7b is carried out at 1 page of the detail paper, respectively It is repeating arranging the surface image data of one line, and the rear-face image data of one line in a longitudinal direction for the image data which does not restrict to the above-mentioned thing and was decrypted in the decryption section 32 as the record approach. As shown in drawing 9 , the image data of a front face 47 and a rear face 48 may be put in order and reconfigured in a longitudinal direction. However, since the size of the image data of a main scanning direction turns into size which it is in this case, contraction processing of infanticide processing of image data etc. is performed, and it reduces so that horizontal-scanning size may be settled in the width of face of the recording paper. Moreover, it is better for the direction of vertical scanning to be made to contract similarly, in order not to spoil recognition nature at this time.

[0102] Thus, the image data of the reconfigured front face 47 and a rear face 48 outputs the image data in the condition of having stood in a line horizontally to the output section 34, and makes the recording paper carry out a record output.

[0103] If it does in this way, memory can be reduced further and facsimile apparatus can be made still cheaper.

[0104]

[Effect of the Invention] The facsimile apparatus which can read a double-sided manuscript to coincidence, can transmit, can read a double-sided manuscript to coincidence and can be transmitted appropriately can be made cheap, without according to the facsimile apparatus of invention according to claim 1, using a mass storage means, since it transmits after taking out and compressing the image data of every one line by turns from a surface reading means and a rear-face reading means.

[0105] According to the facsimile apparatus of invention according to claim 2, the image data of every one line is taken out from a surface reading means and a rear-face reading means by turns. Choose, and since it transmits, whether according to the function of a transmission place, it compresses as it is and transmits, or the compressed image data is recompressed for every rear-face image data with surface image data, and it transmits The suitable image data according to a phase hand's function can be transmitted, and the record output of the image of a double-sided manuscript can be carried out suitable for a phase hand.

[0106] It faces according to the facsimile apparatus of invention according to claim 3, taking out the image data of every one line from a surface reading means and a rear-face reading means by turns, and compressing by predetermined two dimensional coding. Since the image data of beforehand Rhine in present Rhine which is carrying out current coding is referred to as reference Rhine Also when carrying out compression coding by two dimensional coding, it can encode referring to Rhine which has